

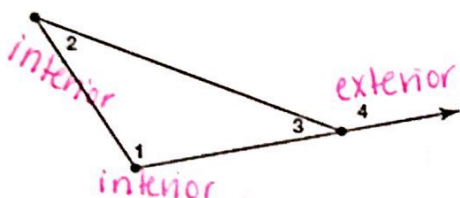
# Day 2 – More Triangle Angle Relationships Notes

**Exterior Angle Theorem:** The measure of the exterior angle is equal to the sum of two remote interior angles.

Interpret: What does exterior mean? outside  
 What does interior mean? inside  
 What does remote mean? far away

**Proof:** Prove the Exterior Angle Theorem:

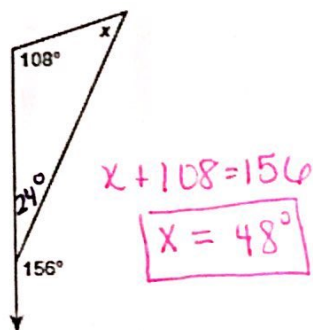
Given:  $\angle 1$ ,  $\angle 2$ , and  $\angle 3$  are interior angles.  
 Prove:  $\angle 4 = \angle 1 + \angle 2$



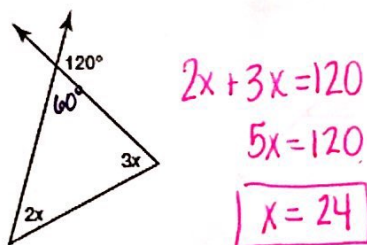
Statements	Reasons
1. $\angle 1$ , $\angle 2$ , and $\angle 3$ are int. angles.	1. <u>Given</u>
2. $\angle 1 + \angle 2 + \angle 3 = 180$	2. Triangle Sum Theorem
3. $\angle 3 + \angle 4 = 180$	3. Definition of a Linear Pair
4. $\angle 1 + \angle 2 + \angle 3 = \angle 3 + \angle 4$	4. Transitive/Substitution
5. $\angle 1 + \angle 2 = \angle 4$	5. Subtraction Property

**Examples:**

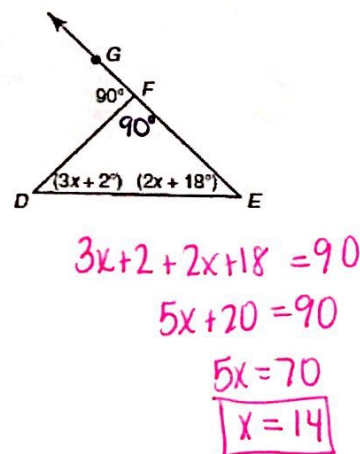
A.



B.



C.



Solve for x using the Triangle Sum Theorem: (in purple)

a.

$$24 + 108 + x = 180$$

$$132 + x = 180$$

$$x = 48^\circ$$

b.

$$60 + 2x + 3x = 180$$

$$60 + 5x = 180$$

$$5x = 120$$

$$x = 24$$

c.

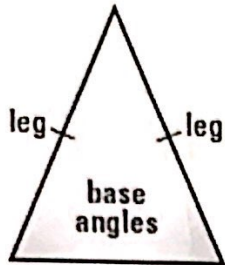
$$3x + 2 + 2x + 18 + 90 = 180$$

$$5x + 110 = 180$$

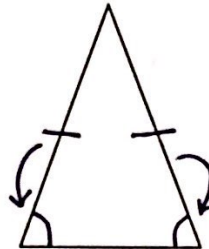
$$5x = 70$$

$$x = 14$$

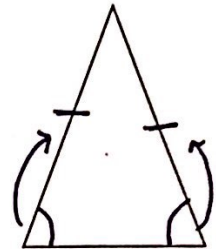
Isosceles Base Angle Theorem and Its Converse



Isosceles Triangle



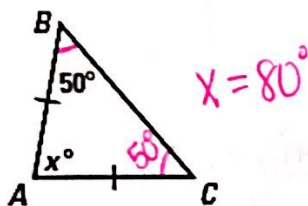
**Base Angles Theorem:**  
If two sides of a triangle are congruent, then the angles opposite them are congruent.



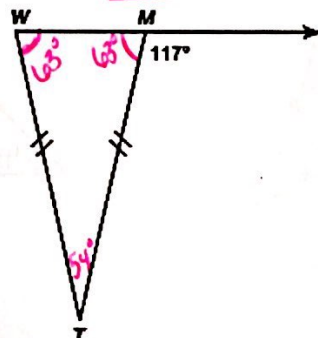
**Converse of Base Angles Theorem:**  
If two angles of a triangle are congruent, then the sides opposite of them are congruent.

Examples:

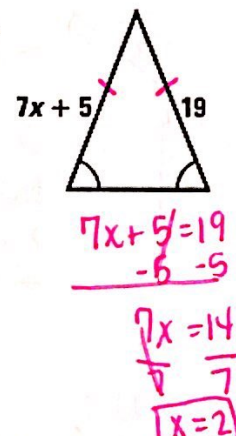
A. Find the value of  $x$



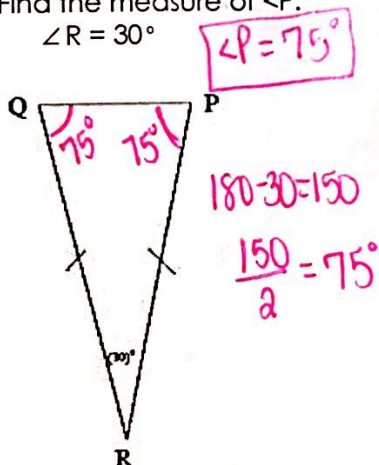
B. Find the  $m\angle T = 54^\circ$



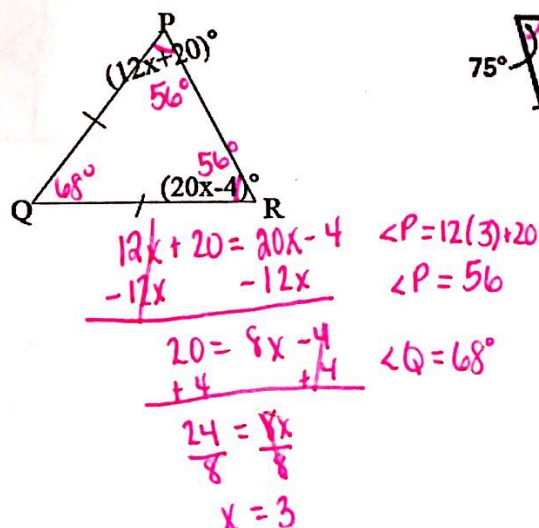
C. Find the value of  $x$ .



D. Find the measure of  $\angle P$ .  
 $\angle R = 30^\circ$



E. Find the measure of  $\angle Q$



F. Find the value of  $x$  &  $y$ .

